

ADDRESSING FLOOD CHALLENGES IN GHANA: A CASE OF THE ACCRA METROPOLIS

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Flooding has been a global pandemic for the past decade. In Ghana, it has been an annual tragedy occurrence, particularly in the capital city, Accra resulting in loss of lives and property. Regardless of the many suggested solutions in mitigating these floods, Ghana still experience excessive flooding. The study through an exploratory literature review methodology, reports on the challenges faced in addressing flood control strategies in the capital city of Ghana and makes recommendations for implementation. The study revealed that the single dimensional approach to flood management, lack of adequate funding, poor attitude of residence (Ghanaians) towards the environment and sanitation and finally the ad-hoc management solution to flood posed a major challenge in addressing flood situations. It is recommended that a more sustainable strategy for flood management, holistically addressing flood challenges, intensifying education and prompt prediction of flood occurrence and timely and adequate funding for flood management activities would help address flood challenges. The study makes contribution to literature on addressing flood challenges in Accra for consideration by city authorities

Keywords: Accra floods, challenges, flood control, Ghana.

1. INTRODUCTION

Flooding is a natural danger and disaster which displaces people by destroying their lands, houses and other valuable properties (Hague, 1997) and in many cases claiming human lives. This is not to say flooding is all negative; it has some positive impact such as an increase in dam water for irrigation and drinking and sedimentation as well as flood plains regarding eco-system (Okyere, Charles Y., Yira Yacouba and Dominik Gilgenbach, 2012). Over the past decade, flooding has been an annual disaster occurrence in the nations capital, Accra resulting in loss of several properties and lives with the rural poor being the most affected. Over a hundred and fifty (150) persons died as a result of a combination of flood and fire in June 2015 (Asumadu-sarkodie, Samuel, Phebe Asantewaa Owusu, Patrick Rufangura and Samuel Asumadu-sarkodie, 2015). As reported by Asumadu-sarkodie *et al.*, 2015, Flood is the number two national disaster in Ghana occurring about eighteen (18) times, and killing over four hundred (400) people. Furthermore, an estimated total of three point eight-eight (3.88) million people have since been affected and recorded damages worth over one hundred and eight (108) million dollars. These statistics excludes the 3rd June 2015 and 10th June 2016 flood. Urban flooding is, therefore, incontrovertible a growing developmental challenge in Ghana. It is, however, evidence from literature that more flooding should be expected due to climatic changes and variability as well as the

population increase and growth in human settlement (Okyere *et al.*, 2012; Ahadzie, D. K. and D. G. Proverbs, 2011).

In all flood situations, short-term interventions by non-profit organisations, National disaster management organisation (NADMO) as well as international humanitarian organisation have only provided relief to flood victims. However, governments pledge to end flooding has been described by many Ghanaians as mere rhetoric as flood situations keep occurring year after year. Preliminary investigations and commissioned committees report at the aftermath of these flooding mostly professed the causes of these floods and recommendations made for implementation by city authorities led by the city mayor. The study, therefore, holds a position that these recommendations are always taken in good faith for implementations. The study, therefore, seeks to establish the challenges in the implementation of these findings and recommendations which have continually resulted in many more floods.

2. LITERATURE REVIEW

2.1 Flooding in Ghana

Ghana, particularly Accra is inundated with flooding over the past decade as suggested in literature with the most recent occurrence on the 10th June 2016. These flooding can be attributed to both the natural factors of intense rainfall and landslide. On the other hand, human factors such as urbanisation, land use and poor drainage have exacerbated the impact of the flood on affected communities. *Table 1* presents the historical antecedence of flooding in Ghana since 1968.

Table 1. Historical antecedence of flooding in Ghana since 1968

Date of Flood	Impact and Severity of Flood
July 4, 1968	Accra records the heaviest rainfall in 9 years: Accra registered a record rainfall of five inches in the last nine years.
June 29, 1971	Houses collapse in the Twin-City: The twin-city of Sekondi-Takoradi saw one of the worst floods in Ghana in recent years following a downpour which started at night. Several hundreds of dwelling houses collapsed, rendering thousands of people homeless.
July 5, 1995	Flood havoc: Rains which started at midnight caused flooding by morning in low areas of the Accra metropolis. The flood affected not only commuters and vehicles but also the Achimota VRA substation, resulting in power cuts.
June 13, 1997	Accra floods: Hours of intermittent downpour for two days in Accra caused floods which threatened to cut communication in various parts of the city. Some roads in the metropolis were affected, making it difficult for motorists to ply them. Major rivers such as the Odaw and Onyasias appeared on the brink of breaking their banks, forcing some residents to desert their homes for higher and safer grounds. The water in these rivers rose steadily when the rain started about 3 p.m., raising fears of a possible flood disaster as happened on July 4, 1995 and claimed lives and property.
In 1999	In 1999, floods swept through the Upper West the Upper East and the Northern regions, as well as the northern parts of the Brong Ahafo and the Volta regions. Three hundred thousand (300,000) people were affected.
June 28, 2001	Floods Again: It is the worst in Accra since July 4, 1995: An early morning downpour submerged portions of the city, with many houses and structures at Madina, Achimota, Dzorwulu, Avenor, Santa Maria and Adabraka Official Town being affected. Residents of the affected areas who were trapped by the

	flood waters had to climb to safety on trees and rooftops until they were rescued or the flood waters subsided.
In 2007	Floods hit the Upper West, Upper East and Northern Regions. Three hundred and seven thousand, one hundred and twenty-seven people were affected.
May 5, 2010	Rains cause havoc: In Central Accra, Ofankor and Begoro. The country's capital city's vulnerability to floods manifested when parts of the city and its streets were deeply submerged in water after two hours of stormy rains.
June 22, 2010	Nation's worst flood disaster: Death toll 35: Thirty-five bodies were retrieved from floodwaters across the country by volunteers and rescue workers who described the havoc after the rains as the worst flood disaster in Ghana's recent history.
June 24, 2010	Swedru cut off by floods: Three bridges connecting the Agona Swedru Municipality to neighbouring communities collapsed as a result of the flooding.
June 26, 2010	NADMO registers 3,000 flood victims in Agona Swedru: At least 3,000 people were registered by officials of the National Disaster Management Organisation (NADMO) as victims of floods in the Agona West Municipality in the Central Region.
October 14, 2010	Floods displace 161,000 nationwide: One hundred and sixty-one thousand people were displaced across the country as a result of flooding during torrential rains and the opening of the Bagre Dam in Burkina Faso.
October 18, 2010	Floods submerge 55 communities: Fifty-five communities in the Central Gonja District in the Northern Region, including parts of the district capital, Buipe, were submerged by flood waters following the overflow of the Volta Lake.
November 2, 2010	Floods cause havoc in Afram Plains: Two thousand and eight hundred people in 120 villages and towns along the Volta Lake in the Kwahu East, Kwahu South and Kwahu North districts in the Eastern Region were rendered homeless by floods. The floods also destroyed 850 buildings, farms, markets and roads.
February 24, 2011	Heavy rains cause havoc in Accra: A downpour wreaked extensive havoc on property in most parts of Accra and some of its surrounding communities. The property of residents of areas such as Adabraka, Kisseman, Alajo Junction, A-Lang at Santa Maria, Oyarifa, Haatso, Adenta and the Tema Timber Market were either submerged or washed away. According to an official of the Meteorological Services Agency, Ms Felicity Ahasianyo, the rainfall, which began from 9.30 p.m. to almost 3 a.m., measured 71.5 mm, which she described as quite heavy.
July 20, 2011	Heavy floods in Atiwa District: Farmers stranded for 3 days: About 10 hours of torrential rain left 105 farmers stranded on farms at Akyem Osoroase Krobomu in the Atiwa District in the Eastern Region.
July 25, 2011	Floods kill 5 at Atiwa, cause damage in other areas: Five persons drowned after rains which caused floods in the Atiwa District in the Eastern Region.
November 1, 2011	43,000 displaced by Accra floods...14 deaths recorded: The death toll in Accra rose to 14, while 43,087 people were said to have been affected by the downpour, officials of the National Disaster Management Organisation (NADMO) said.
May 31, 2013	Morning downpour causes floods in Accra: Heavy rains caused flooding in some parts of Accra. The rains, which started in some areas around 4.30 a.m., flooded areas such as the Kwame Nkrumah Circle, Darkuman Kokompe, the Obetsebi Lamprey Circle and portions of the Graphic Road, Santa Maria and the Dansoman Roundabout.
June 6, 2014	Deluge hits Accra; more rains predicted: Accra's poor planning was exposed when a deluge hit the national capital after more than 10 hours of

	downpour. The heavy rains caused flooding in the city and its environs, including Adabraka, Awoshie, the Kwame Nkrumah Circle, Mallam, North Kaneshie, Abeka, Dansoman and Odorkor.
July 4, 2014	Heavy rains leave havoc in trail: Heavy rains resulted in havoc, with the worst hit areas in Accra such as Anyaa, Taifa, Dome, Nii Boi Town, Dansoman, some parts of Kaneshie, Adabraka, Awoshie, the Kwame Nkrumah Circle, Mallam, Abeka, Dansoman and Odorkor submerged.
*June 3rd and 4th 2015	Residents of Ghana's capital, Accra experience unprecedented flood: A combination of extreme floods and an explosion at a sales point of the Ghana Oil Company (Goil) at the Kwame Nkrumah Circle claimed over 150 lives and displaced thousands of residents. The disaster started with normal rainfall, but the rains intensified as the night wore on resulting in a historic flooding in many parts of the city.
*June 10th 2016	Flood hits parts of Accra and Cape Coast leaving one missing (feared dead) in Accra and about five (5) dead in Cape Coast. Parts of the country continues to experience heavy rains with fear of possible floods.

Source: Adopted from Graphiconline.com, Flood disaster profile of Ghana since 1968, (2016)

Literature abounds with studies providing insight into the causes and severity of the floods, particularly in the nation's capital. Accra topography is naturally a low-lying area, and unless otherwise carefully planned, flooding will forever continue. Unfortunately, planning has been a major problem across the country. It has been reported by Abraham, E. M., Drechsel, P. and Cofie, O. 2002 that abt 60% of Accra dwellers lives in slums where flood is mostly experienced. Metropolitan, Municipal and District Assemblies (MMDAs) have had challenges in dealing with development controls thus having people to construct residential buildings along water course haphazardly and also creating slum situations. Table 2 below shows a summary of studies revealing the causes of flooding in Accra gathered from literature.

Table 2. Summary of some causes of flooding in Accra

AUTHORS	SOME CAUSES OF FLOOD	SOME PROPOSED RECOMMENDATIONS
Ghana – Floods Situation Report. 2015.	Haphazard construction of residential buildings on watercourse; inadequate drainage and a poor waste management system which chokes the open drains with refuse.	
Okyere, Charles Y., Yira Yacouba and Dominik Gilgenbach, 2012	Making reference to Amidu (2010), identified causes of flood included defective engineering works, building on waterways, changes in land use due to urbanization, poor land administration and planning, poor sanitation, and lack of drainage maintenance, obstructive activities by utility agencies, tidal influence of the sea, and inadequate funding for flood mitigation measure	
Abraham, E. M., Drechsel, P. and Cofie, O. 2002	Blockage of stormwater drainage outlets, poor sanitary situations of slums along river bodies, poor network of gutters and storm drains.	
Ahadzie, D. K. and Proverbs, D. G., 2011	Human activities such as, poor and unregulated construction practices, and inadequate drainage systems that are also poorly maintained have been blamed for contributing to flooding in Accra. Further, poor consciousness of the inhabitants on the environmental information and inadequate spatial information on flood-prone areas needs attention.	

Asumadu-sarkodie, S., Owusu, P. A. and Jayaweera, H.M.P.C., 2015	Poor waste disposal management resulting in choked rivers, basins and culverts contributed to flooding in Accra	De-silting gutters, river channels, and culverts that are frequently taken up by solid waste to improve the hydraulic performance of drains and increase the carrying capacities. This will directly reduce peak discharge. An enforcement of building regulations that prevents people from building in flood-prone areas and floodplains will help to reduce flood frequencies in Accra
Rain, D., Engstrom, R., Ludlow, C. and Antos S., 2011	The massive growth of the city leading to increasing extent of impervious surfaces. This has lead to increase in discharges that overloads drainage channels, Also flaws in discharge network such as undersized, unconnected or improper channelled drains. He also identified poor development controls, limited garbage collection and disposal caused by blocked channels.	
Karley, N.K, 2009	Lack of drainage facilities to collect storm water for safe disposal, as a result of ineffective planning regulations which either ignored or condone the illegal erection of buildings and other structures on flood plains and unhealthy habit of dumping refuse and other solid waste in the usually open channel drainage systems	Sustainable urban drainage systems

Source: Review of literature

It is, however, clear that the interventions by the government, national disaster management organisation (NADMO) and other local and international philanthropic /corporate organisations through relief items such as mattresses, used clothing, blankets, bags of rice and soap are temporal and short-term reliefs. These interventions do not contribute to the managing to prevent or reduce subsequent flooding in the city. There is, therefore, the need for sustainable long-term measure to flood control in the country.

2.2 Addressing flood situation in Ghana

The feeling of many Ghanaians is that of being hopeful and trusting God that they survive any flood situation that may occur. Regardless of the enormous literature and reports on the causes of flood and also the presence of recommendations to reduce or control flood, the city of Accra has never been spared from the negative effect of flood anytime it occurs.

Beyond the short-term reliefs provided by the government, special measures have been taken towards addressing this natural disaster.

The introduction of the national sanitation day in 2014 which seeks to clean up choked gutters and keep the city clean from the heaped piles of garbage has been one monumental step taking towards address one major widely reported means by which flood can occur in Accra (Choked drains), (Ghana – Floods Situation Report. 2015). This initiative though has however been described as a knee-jerk response to promoting a healthy environment and subsequently addressing the impact of any

future flood in the city by Isaac Monney, (n.d), the local government workers union of Ghana (LGWU) has described the institution of the sanitation day program as a national duty call and admonishes all citizens to participate.

There has been great commitment by governments to construct hundreds of kilometres of storm drains along the major river basins and also to construct water retention reservoirs in the capital (Ghana – Floods Situation Report. 2015). Bertha Darteh and Marieke Adank (n.d) reported that the capacities of the constructed or existing drains are limited; by their size and also by the fact that they are sometimes silted or choked with refuse. The need, therefore, to assess the volume of runoff water during flooding to ensure appropriate design and construction of new storm drains is the way to go.

Institutional and stakeholder role has become necessary in tackling flood. Ahadzie and Proverbs (2011) acknowledged the effort of the national disaster management organisation (NADMO) in flood situations, constituting a rapid response team to deal with the situation. However, the weaknesses in its operations as they can only offer advice to people in the event of disasters and have no power of enforcing evacuation cannot be overlooked (Ahadzie, D. K. and Proverbs, D. G., 2011). Efforts by the city authorities to check the situation continue to be undermined by recalcitrant residents and weak law enforcement.

Education towards establishing a better understanding of flooding and its prediction is minimal in Ghana. It is imperative to know that the scanty or limited information regarding the prediction of the possibility of heavy storm leading to possible flooding is poorly circulated and taken for granted by most Ghanaians when such information is received. Findings from the study by Ahadzie, D. K. and Proverbs, D. G., in 2011 revealed that the nation lacked a well-developed flood risk management plan to predict and warn victims of potential flood.

3. METHODOLOGY

An exploratory review of literature through the desktop study of leading journals and academic repositories on flood control mechanisms are explored. The paper examined literature from peer reviewed journals articles and conference proceedings as well as relevant internet sources. Studies on flood control mechanisms were reviewed to understand the causes of flooding and some remedial measures to mitigate flood situations. A further review of the challenges in addressing flood situations in Ghana are explored and recommendations made for implementation.

4. FINDINGS AND CONCLUSIONS

Addressing and management of floods in Accra-Ghana have seen enormous reviews. Studies by Okyere, C.Y., *et al.*, 2012; Abraham, E. M., *et al.*, 2002; Ahadzie, D. K. and Proverbs, D. G., 2011; Asumadu-sarkodie, S., *et al.*, 2015; Rain, D., *et al.*, 2011 and Karley, N.K., 2009 have all outlined major but familiar causes to the occurrence of flood in Ghana particularly in the nation's capital, Accra.

Efforts by government, government institutions and stakeholders such as the National Disaster Management Organization (NADMO), Hydrological and Meteorological Service of Ghana, Accra Metropolitan Department, Town and Country Planning

Department and Ministry of Environment, Science Technology and Innovation have been acknowledged in literature towards dealing with flood challenges in Accra.

The major constraint in addressing flood challenge in Accra-Ghana however, has to do with;

- a. The ad-hoc (knee-jerk) management solutions in addressing flood before during and after flood occurrences. More sustainable and proactive strategies are needed to at least minimise the impact on flood victims.
- b. Accra flood has a multidimensional cause and therefore must be approached as such. Thus, concentration of sanitation at the expense of constructing, maintaining and desilting storm drains will yield fruitless results.
- c. Poor attitudes of residents toward the environment and sanitation must change. Education and prediction of flood occurrence must be prompt and throughout the year and intensified during the major raining season (May-July).
- d. Finally, funding for has been limited and inconsistent. It is seen to be well funded with floods occur, and pledges are then made by government towards the release of funds for mitigation measures. Conscious allocation of financial resources by central government will ensure readiness to act during flood situations.

5. REFERENCES

- Abraham, E.M., P. Drechsel and O. Cofie. "The Challenge of Urban Flood Control: The Case of Accra's Korle Lagoon." (2002).
- Ahadzie, D. K. and D. G. Proverbs. "Emerging Issues in the Management of Floods in Ghana." *International Journal of Safety and Security Engineering*. Vol.1, No. 2 (2011): 182-192.
- Asumadu-sarkodie, S., Owusu, P.A., and Rufangura, P. "Impact Analysis of Flood in Accra, Ghana." Vol.6, No. 9 (2015): 53-78.
- Asumadu-sarkodie, S., P.A. Owusu and H.M.P.C. Jayaweera. "Flood Risk Management in Ghana: A Case Study in Accra." *Advances in Applied Science Research* 6, no. 4 (2015): 196-201.
- Bertha Darteh and Marieke Adank, Stormwater Solutions in Ghana, Waterworld (n.d), Retrieved from <http://www.waterworld.com/articles/2011/09/stormwater-solutions.html>. On 16th June 2016
- Ghana News Agency. Ghanaians must see sanitation day as a national duty call – LGWU. Retrieved from <http://www.ghana.gov.gh/index.php/media-center/news/128-ghanaians-should-see-sanitation-day-as-national-duty-lgwu> On 15th June 2016
- GHANA, UNCT. *Ghana – Floods Situation Report*. 2015. Retrieved from https://www.humanitarianresponse.info/en/system/files/documents/files/unct_sitrep_accra_floods_08062015.pdf. On 13th June 2016
- Graphiconline.com. Flood disaster profile of Ghana since 1968. Retrieved from <http://www.graphic.com.gh/news/general-news/flood-disaster-profile-of-ghana.html> On 13th June 2016
- Hague CE. "Hazards in a fickle environment: Bangladesh. Kluwer", Dordrecht, p XV, 380, 1997
- Karley, N.K. flood and Physical Planning in Urban areas in West Africa: Situational Analysis of Accra Ghana. Theoretical and empirical Research in Urban Management (2009), Vol. 4 Issue 13, pp 25-41
- Monney Issac. National Sanitation Day: Is it another knee-jerk reaction to Ghana's sanitation issues? (n.d), Retrieved from https://www.academia.edu/10056383/National_Sanitation_Day_Is_it_another_knee-jerk_reaction_to_Ghanas_sanitation_issues On 15th June, 2016
- Okyere, Charles Y., Yira Yacouba and Dominik Gilgenbach. "The Problem of Annual Occurrences of Floods in Accra: An Integration of Hydrological, Economic and Political Perspectives." Interdisciplinary Term Paper, Zentrum für Entwicklungsforschung, 2012.
- Rain, D., Engstrom, R., Ludlow, C. and Antos S. Accra Ghana: A city vulnerable to flood and drought-induced migration. Case study prepared for cities and climate change: Global Report on human Settlement (2011), pp 1-21